

AS  
(Cont'd)  
5 a generator for generating at least one of the electric field and the magnetic field and applying the at least one of the electric field and the magnetic field to the material;

a camera configured to capture an image of the material after the at least one of the electric field and the magnetic field is applied to the material; and

an analyzer unit configured to determine a change in shape or size of the material based on the captured image.

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### Remarks

15 I. INTRODUCTION

Claim 15 has been canceled without prejudice. Claims 17-22 have been added. Accordingly, claims 1-14 and 16-22 are now pending in the present application.

20 The drawings are objected to under 37 CFR 1.83(a) for failing to show every feature of the invention specified in the claims. The drawings are also objected to under 37 CFR 1.83(b) for being incomplete.

25 Claims 1-16 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Claims 1-3, 7-8, and 13-14 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,562,345 to Heyman et al. ("Heyman"). Claims 1, 2, 6, 8, 9, 13, and 14 stand rejected  
30 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,004,617 to Schultz et al. ("Shultz"). Claims 5 and 15-16 stand rejected under 35 U.S.C. § 103(a) as obvious over Heyman in view of U.S. Patent No. 5,209,569 to Fujiwara et al. ("Fujiwara"). Claims 5 and 10-12 stand rejected under 35

U.S.C. § 103(a) as being obvious over Shultz in view of U.S. Patent No. 5,949,102 to Holcomb ("Holcomb").

## **II. OBJECTION TO THE DRAWINGS**

5           The drawings are objected to under 37 CFR 1.83(a) for failing to show every feature of the invention specified in the claims. The drawings are also objected to under 37 CFR 1.83(b) for being incomplete. Applicant has amended the drawings to include a revised Fig. 1. No new matter has been  
10 added. It is believed that the drawings now comply with 37 C.F.R. 1.83(a) and 1.83(b). Accordingly, Applicant respectfully requests that the objections to the drawings be withdrawn.

## **15   III. REJECTION UNDER 35 U.S.C. § 112, SECOND PARAGRAPH**

          Claims 1-16 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention.

20           The Applicant submits that the above amendments to the claims obviate the Examiner's 35 U.S.C. § 112, second paragraph rejections to these claims. With regard to Examiner's request to identify the element corresponding to the term "electric contacting" of claim 10, Applicant directs  
25 the Examiner's attention to page 4, lines 13 to 15 of the Specification, as well as to element 4 of Figure 2 and corresponding description found on page 6, line 31 to page 7, line 2.

          In view of the foregoing, the Applicant respectfully  
30 submits that the rejections under 35 U.S.C. § 112, second paragraph have been overcome and should be withdrawn.

## **IV. REJECTION OF CLAIMS 1-3, 7-8 and 13-14 UNDER 35 U.S.C. § 102(b)**

Claims 1-3, 7-8 and 13-14 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,562,345 to Heyman et al. ("Heyman"). Claim 1 has been amended to include the subject matter of canceled claim 15. It is respectfully submitted that Heyman does not anticipate any of claims 1-3, 7-8 and 13-14 for at least the following reasons.

Claim 1 as amended recites the following:

A device for testing a material that changes shape when at least one of an electric field and a magnetic field is applied, comprising:

...  
a measurement unit for measuring a change in shape of the material after the at least one of the electric field and the magnetic field is applied.

Heyman, by contrast, fails to disclose an measurement unit for measuring a change in shape of the material as recited in claim 1. Indeed, the Examiner does not allege that it does. Accordingly, it is respectfully submitted that claim 1 is not anticipated by Heyman.

Claims 2-3, 7-8 and 13-14 depend, either directly or indirectly, from claim 1 and therefore include all of its limitations. Accordingly, claims 2-3, 7-8 and 13-14 are likewise not anticipated by Heyman for at least the same reasons that claim 1 is not anticipated by Heyman. Withdrawal of the rejection of claims 1-3, 7-8 and 13-14 under 35 U.S.C. § 102(b) as anticipated by Heyman is, therefore, requested.

**V. REJECTION OF CLAIMS 1, 2, 6, 8-9 and 13-14 UNDER 35 U.S.C. § 102(b)**

Claims 1, 2, 6, 8-9, and 13-14 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,004,617 to Schultz et al. ("Schultz"). As previously discussed, claim 1 has been amended to recite "an measurement

unit for measuring a change in shape of the material . . . ."  
Applicants respectfully submit that Schultz fails to disclose  
such a measurement unit as recited in claim 1. Indeed, the  
Examiner does not allege that is does. Accordingly, it is  
5 respectfully submitted that Shultz does not anticipate claim  
1.

Claims 2, 6, 8-9, and 13-14 depend, either directly  
or indirectly from claim 1 and therefore include all of the  
limitations of claim 1. Accordingly, claims 2, 6, 8-9 and 13-  
10 14 are likewise not anticipated by Shultz for at least the  
same reasons that claim 1 is not anticipated by Shultz.  
Withdrawal of the rejection of claims 1, 2, 6, 8-9, and 13-14  
under 35 U.S.C. § 102(b) as anticipated by Schultz is,  
therefore, requested.

15 **VI. REJECTION OF CLAIMS 5 and 15-16 UNDER 35 U.S.C. § 103**

Claims 5 and 15-16 stand rejected under 35 U.S.C. §  
103(a) as being obvious over Schultz in view of U.S. Patent  
No. 5,209,569 to Fujiwara et al. ("Fujiwara"). Claim 15 has  
20 been canceled and claim 1 has been amended to include the  
limitations of canceled claim 15. It is respectfully  
submitted that Schultz in view of Fujiwara does not render  
obvious any of claims 5 and 16, for at least the following  
reasons.

25 Schultz purportedly concerns methods and apparatus  
for the parallel deposition, synthesis and screening of an  
array of diverse materials at known locations on a single  
substrate surface, which is prepared by delivering components  
of the materials to predefined regions on the substrate and  
30 simultaneously reacting the components to form at least two  
materials. Once prepared, Schultz purports that the materials  
can be screened in parallel for useful properties including,  
for example, electrical, thermal, mechanical, morphological,  
optical, magnetic, chemical, or other properties. (See Schultz  
35 Abstract, col. 1, lines 16-30, and col. 3, lines 19-40).

Fujiwara purportedly concerns an apparatus for measuring the thermal linear expansion coefficient of ceramics under high temperature using a laser measurement instrument instead of a scanning photo diode element, which is limited to a resolution of 1  $\mu$ m. (See Fujiwara col. 1, lines 7-13, and col. 2, lines 6-43).

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a prima facie case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

The Examiner asserts on page 8 of the Office Action states that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to add to the screening device of Schultz a thermal expansion measuring arrangement, as suggested by Schultz, including an imaging unit/optical measuring unit for measuring a change in the shape for measuring a change in the shape or length of the material being tested, as taught by Fujiwara".

Applicants respectfully disagree and submit that the alleged suggestion of adding a thermal expansion measuring arrangement as asserted on page 8 of the Office Action is not found as such in Schultz. Instead, Schultz merely suggests screening for thermal properties of an array of diverse

materials without further elaboration and certainly not any suggestion of a need to measure the thermal linear expansion coefficient of the materials at the submicron level under high temperatures as taught by Fujiwara. Accordingly, the required motivation or suggestion to combine the teachings of Schultz with the teachings of Fujiwara is lacking.

Applicants further submit that the asserted combination of the liquid helium cryogenic system of Schultz and the thermal expansion measuring system of Fujiwara is unlikely to be compatible since they operate at drastically different temperatures -- i.e., the liquid helium cryogenic system is operable at very low temperatures (e.g., sub-zero or below 250° K as demonstrated in Figure 22) while the thermal expansion measuring system of Fujiwara is operable at very high temperatures (e.g., room temperature to 1,800° C as stated on col. 5, line 59). Accordingly, a reasonable expectation of success for the asserted combined elements of Schultz and Fujiwara has not been established as required for an obviousness rejection.

Applicants still further submit that the combination of Schultz and Fujiwara fail to disclose all of the limitations of amended claim 1. In particular, Applicants submit that neither Schultz nor Fujiwara disclose "at least one thermal sensor for detecting a change in temperature of the material associated with the at least one of the electric field and the magnetic field" as recited by amended claim 1. (Emphasis added). Although both Schultz and Fujiwara discuss a variation of the temperature of the material, such variation is not discussed as associated with an applied electric or magnetic field, but rather, as merely independently applied to the material via an unspecified means or via the insertion of the material into a hot furnace. Accordingly, since neither Schultz nor Fujiwara disclose at least one thermal sensor for detecting a change in temperature of the material associated with the electric or magnetic field as recited in amended

claim 1, amended claim 1 is not rendered obvious by their combination. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974) (prior art reference(s) must teach or suggest all of the claim limitations).

5           Claims 5 and 16 depend from claim 1 and therefore include all of the limitations of claim 1. Accordingly, claims 5 and 16 are likewise not rendered obvious for at least the same reasons that claim 1 is not rendered obvious. In re  
10 Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) (any dependent claim that depends from a non-obvious independent claim is non-obvious).

15           In view of the foregoing, it is respectfully submitted that Schultz in view of the Fujiwara does not render obvious any of claims 5 and 16. Withdrawal of the rejection of claims 5 and 16 under 35 U.S.C. § 103 over Schultz in view of the Fujiwara is, therefore, requested.

#### VII. REJECTION OF CLAIMS 5 and 10-12 UNDER 35 U.S.C. § 103

20           Claims 5 and 10-12 stand rejected under 35 U.S.C. § 103(a) as being obvious over Shultz in view of U.S. Patent No. 5,946,102 to Holcomb ("Holcomb"). It is respectfully submitted that Shultz in view of Holcomb does not render obvious any of claims 5, 10, and 12, for at least the following reasons.

25           As previously set forth, Schultz does not disclose a measurement unit for measuring a change in shape of the material as recited in amended claim 1. It is respectfully submitted that Holcomb also fails to disclose this element recited by amended claim 1. Indeed, the Examiner does not  
30 allege that it does. Accordingly, since neither Schultz nor Holcomb disclose a measurement unit as recited in claim 1, claim 1 is not rendered obvious by their combination. In re  
Royka, supra (prior art reference(s) must teach or suggest all of the claim limitations).

Claims 5 and 11-12 depend, either directly or indirectly, from claim 1 and therefore include all of the limitations of claim 1. Accordingly, claims 5 and 11-12 are likewise not rendered obvious for at least the same reasons claim 1 is not rendered obvious. In re Fine, supra (any dependent claim that depends from a non-obvious independent claim is non-obvious).

In view of the foregoing, it is respectfully submitted that Schultz in view of Holcomb does not render obvious any of claims 5 and 11-12. Withdrawal of the rejection of claims 5 and 11-12 under 35 U.S.C. § 103 over Schultz in view of Holcomb is, therefore, requested.

**VIII. NEW CLAIMS 17-22**

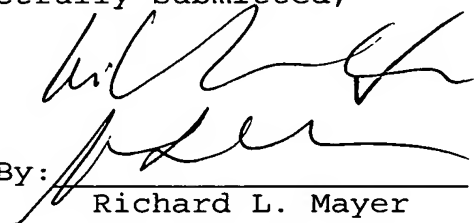
New claims 17-22 have been added to recite further features of the present invention. No new matter has been added. Support for the subject matter of claims 17-22 can be found throughout the specification.

**IX. CONCLUSION**

It is respectfully submitted that all pending claims are in condition for allowance. Passage to issuance is, therefore, requested.

Respectfully submitted,

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AMENDMENT VERSION WITH MARKINGS SHOWING CHANGES MADE

IN THE CLAIMS:

Please cancel claim 15, without prejudice.

Please amendment the claims as follows:

5

1. (Amended) A device for testing a material that changes shape when at least one of an electric field and a magnetic field is applied, comprising:

10 a generator for generating at least one of the electric field and the magnetic field and applying the at least one of the electric field and the magnetic field to the material; [and]

15 at least one thermal sensor for detecting a change in temperature of the material associated with the at least one of the electric field and the magnetic field; and

a measurement unit for measuring a change in shape of the material after the at least one of the electric field and the magnetic field is applied.

20 5. (Amended) The device according to claim 1, further comprising:

an imaging unit for obtaining an image of the material.

25 6. (Amended) The device according to claim 1, further comprising:

a unit for varying at least one of the electric field and the magnetic field generated by the generator.

30 7. (Amended) The device according to claim 1, further comprising:

AMENDMENT VERSION WITH MARKINGS SHOWING CHANGES MADE

a unit for periodically varying at least one of the electric field and the magnetic field generated by the generator.

5           11. (Amended) The device according to claim 1, further comprising:

            a detection unit for detecting a portion of a heating of the material attributed to an electric current associated with the at least one of the electric field and the  
10     magnetic field.

            16. (Amended) The device according to claim 1, further comprising:

            an optical measurement unit for measuring a change  
15     in at least one of a shape and a length of the material.

            Please add the following new claims:

            17. (New) The device according to claim 1, wherein the  
20     at least one thermal sensor includes a non-optical thermal sensor.

            18. (New) The device according to claim 5, wherein the  
25     imaging unit includes at least one of a photographic unit and a camera unit.

            19. (New) The device according to claim 7, wherein the  
30     at least one of the electric field and the magnetic field varies periodically as one of a sinusoidal change and a square-wave change.

AMENDMENT VERSION WITH MARKINGS SHOWING CHANGES MADE

20. (New) The device according to claim 9, wherein the arrangement for performing a temperature control of the substrate includes at least one of a climate chamber, a heating device, and a cooling device.

5

21. (New) The device according to claim 1, wherein the electric contacting includes at least one of a sputtered metal layer and a glued metal layer.

10

22. (New) A device for testing a material that changes shape when at least one of an electric field and a magnetic field is applied, comprising:

a generator for generating at least one of the electric field and the magnetic field and applying the at least one of the electric field and the magnetic field to the material;

a camera configured to capture an image of the material after the at least one of the electric field and the magnetic field is applied to the material; and

an analyzer unit configured to determine a change in shape or size of the material based on the captured image.